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# A Two-Step Personalized Location Recommendation based on Multi-objective Immune Algorithm

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## Abstract

The increasing number of users participating in location-based social networks has resulted in an information overload problem. Recommendation is a process that can free users from this dilemma. Most algorithms either ignore geographical and social properties, or require a tunable coefficient to determine the effect of each property on the outcome. Simultaneously combining these properties has proven to be a challenge. In this paper, we propose a two-step personalized location recommendation that is based on a multi-objective immune algorithm. It can simultaneously optimize the matching qualities of similarity and geographic properties as two functions, thereby providing location recommendations by improving one desired objective without detracting from the other. In the process, each list provides a different compromise between the similarity of check-in preferences and the geographical influence of the user. The user is offered choices from a set of lists that are compiled from the individual's selection of the various tradeoffs. The advantage of this algorithm is that it can recommend user lists without the need to tune any of the weighting coefficients. Experiments performed using the actual data demonstrated that the proposed algorithm is promising and is an effective means for providing accurate recommendations for a user's desired location.

*Keywords:*

Location-based social networks; geographical information; multi-objective immune algorithm; recommender systems;

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